INTEGRATED SPACE PLAN (Preliminary)

Rockwell International
Space Transportation Systems Division

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PRELIMINARY VERSION
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ABOUT THIS DIAGRAM:

The Rockwell Integrated Space Plan (ISP) is a very long range systematic perspective of America's space program. Its 100-plus-year vision was created from the integration of numerous NASA long-range studies including project Pathfinder, recommendations from the National Commission on Space's report to the President, the Ride report to the NASA Administrator, and the new National Space Policy Directive. Special initiatives such as the four described in the Ride Report, (i.e, Mission To Planet Earth, Exploration of the Solar System, Outpost on the Moon, and Humans to Mars) are integral parts of the ISP. These four initiatives as well as the program described in the National Commission on Space report, are shown by shading the appropriate boxes involved. These shaded versions are included separately as attachments to the ISP. The ISP is not meant to be a definitive plan for the development of space, but rather a compilation of evolutionary opportunities for our near-term and long-range space activities.

The ISP can be read from top to bottom or left to right. From top to bottom, vertical column elements are phased in chronologically to support centerline milestones. Reading across the columns from left to right will yield the total scope of required activity within a given time period in support of the total "integrated" plan. The centerline of the ISP is the critical path (goals) defined by National Space Policy. The Space Shuttle and Space Station are essential initial elements; their value increases through the 1990's as infrastructure evolves. Arrows between boxes depict evolutionary, supporting, or synergistic relationships. Bold lines are trunk lines with numerous (2 or more) branches stemming from along their length. Boxes with bold outlines are either long-range (centerline) objectives or key "enabling programs" important because their development affects the development of many other programs. Boxes with double lines are in-space transportation nodes. The ISP is chronologically portrayed in five year time intervals because this is a practical segment of time for planning and implementation of program objectives. Obviously, the dates shown have an uncertainty which increases with time, but the chronology is intended to be consistent. Finally, the large bubbles represent the synergistic summation of the individual elements of that period. They are the highest level groups of goals; plateaus of human achievement attainable through a comprehensive execution of the depicted ISP elements.

This preliminary version of the ISP is being distributed for comments and inputs. Updates will be made approximately every 3 months and copies will be available from Rockwell. Send your comments, suggestions, changes, etc. to:

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1983

1988

1993

1998

2003

FIRST GENERATION OF REUSABLE SPACECRAFT

* THE AMERICAN SPACE SHUTTLE

AMERICAN SPACE SHUTTLE PROGRAM (NSTS)

RMS

IUS

EMU

MMU

SATELLITE RETRIEVAL AND SERVICING

SOLAR MAX / SPACE TELESCOPE MISSION TYPES

SATELLITE REFUELING CAPABILITY

TDRS CONSTELLATION

OV-105 CONTRACT AWARD

OV-106 CONTRACT AWARD

EXPENDABLE LAUNCH VEHICLES - INTERNATIONAL

PRIVATE LAUNCH VEHICLES (ELV'S)

GOVERNMENT - COMMERCIAL SATELLITE DEPLOYMENT

DEFENSE SATELLITES

PLANETARY / SCIENTIFIC MISSIONS

SPACELAB

GPS CONSTELLATION

HUBBLE SPACE TELESCOPE

GAMMA RAY OBS

TETHERED SATELLITE

INTERNATIONAL LAUNCH VEHICLE CAPABILITIES

VEHICLE	# TO LEO	# TO GEO	GEO-CIRCULAR	FIRST FLIGHT
TITAN 2	5,500			1988
DELTA 2	11,100	3,190	1,350 (PAM-D)	1988
ATLAS 2	12,300	5,200	2,500	1990
TITAN 3	33,000	8,600	4,200 (IUS)	1989
TITAN 4	40,000	12,500	10,000 (CENTAUR)	1988
SHUTTLE	55,000		5,000 (IUS) 6,500 (TOS)	1981
SHUTTLE C	150,000		20,000 (CENTAUR)	1994
ALS	200,000			1998
ARIANE 3		5,690	2,780	
ARIANE 4		9,260	2,300 - 4,800	1988
ARIANE 5	46,000	14,960	7,750	1995
H-1		2,300	1,210	1986
H-2		9,000	4,000	1992

ABUNDANT NEAR-EARTH EXTRATERRESTRIAL RESOURCES

RESOURCE	MOON	PHOBOS/ DEIMOS	ASTEROIDS	COMETS	ELEMENT NAME
Al	X				ALUMINUM
C		X	C	X	CARBON
Ca	X				CALCIUM
Fe	X		M		IRON
H		X	C	X	HYDROGEN
He3	X				HELIUM 3
Mg	X				MAGNESIUM
N		X	C	X	NITROGEN
Ni	X		M		NICKEL
O		X	C	X	OXYGEN
Si	X				SILICON
Ti					TITANIUM
H2O	?	X	C	X	WATER

* METALLIC=M
CARBONACEOUS=C

LEO ET RESOURCE BASE

RESOURCE	LBS/TANK	ELEMENT NAME
Al	56,490	
C	2,760	
Cr	188	CHROMIUM
Cu	3,450	COPPER
Fe	415	
H	466	
Mg	268	
N	246	
Ni	200	
O	1,725	
Si	690	
Ti	220	
Zn	173	ZINC

ROBOTIC EXPLORATION

MAGELLAN

GALILEO

ULYSSES

MARS OBSERVER

PERMANENT HUMAN PRESENCE IN SPACE BEGINS

* THE SOVIET MIR SPACE STATION

THE WEST'S
* INTERNATIONAL SPACE STATION FREEDOM

CISLUNAR TRANSPORTATION AND HEO OPERATIONS

SPACEHAB

EDO

CDSF

EVOLVABLE OMV

ET / ACC

EVOLVABLE OTV

FTS

CREW RETURN VEHICLE

WASTE DUMP

MOMV

SPACE HARBORING / SERVICING / TENDING & LEO PROPELLANT DEPOT

REMOTE TENDED GEO

DEEP SPACE/PLANETARY MISSIONS DEPLOYMENT

LEO QUARANTINE

COMMERCIAL AND DEFENSE SAT LAUNCHES

EXTERNAL TANK RESOURCE BASE / MOMENTUM RESERVOIR

UNMANNED GEO COMM AND ERT PLATFORMS

US / INTERNATIONAL SPACE STATION PROJECT

MISSION FOR PLANET EARTH

MISSION TO PLANET EARTH - ELEMENT & DATA INTEGRATION

COORBITING LOW INCLINATION PLATFORMS

STATION STRUCTURE

INTERNATIONAL SPACE STATION ELEMENTS

LOGISTICS ELEMENTS

DOD SPACE STATION ELEMENT / ACTIVITIES

FREE FLYING SPACE MANUFACTURING / LABS

VARIABLE "G" BIO-MEDICAL RESEARCH FACILITY

EXTERNAL TANK DERIVED WORKSHOPS (WET / DRY)

EXTERNAL TANK DERIVED PLATFORMS

TETHERED SYSTEMS

ASTRONOMICAL AND PLANETARY OBSERVATIONS

LDF

AXAF

MKW SOLAR ARRAYS

SIRTF

HORTICULTURAL RESEARCH

MMW POWER PLANT

NEAR CLOSED-LOOP ECLSS

GRAVITY GRADIENT STABILIZATION

LOW LEVEL IN SPACE COMMERCE BEGINS

* COMMUNICATION
* BIO-TECHNOLOGY
* MATERIALS TECHNOLOGY
* ELECTRICAL MATERIALS
* REMOTE SENSING AND RECONNAISSANCE
* SATELLITE SERVICING AND DEPLOYMENT

SURFACE TO LEO AND IN-SPACE TRANSPORTATION SYSTEMS

ARIANE 4

SHUTTLE RETURN-TO-FLIGHT

TITAN 2

DELTA 2 (MLV-1)

TITAN 3 / 34D

TITAN 4

ATLAS 2 (MLV-2)

ADVANCED SECOND SOURCE SRB / LRB

NASA'S SHUTTLE "C"- SHUTTLE DERIVED HEAVY LIFT CAPABILITY

SLC-6 VANDENBERG UTILIZATION

FIVE SHUTTLE FLEET

DOD'S ALS- NASA / DOD HEAVY LIFT VEHICLE

ALS LAUNCH FACILITIES

EUROPEAN ARIANE 5 LAUNCH CAPABILITY

SDI / DOD LAUNCH PROGRAMS

JAPANESE H-2 HEAVY LIFT CAPABILITY

NATIONAL AERO-SPACE PLANE / INTERIM ORBITER

POLAR ORBIT ACTIVITIES

POLAR ORBITING MPE ENVIRONMENTAL OBSERVATION PLATFORMS - 4 PLATFORMS DEPLOYED 1994 THRU 1997

MANNED POLAR ORBITING SPACE SHUTTLE

POLAR ORBIT EXTERNAL TANK DEPLOYMENT

SECOND GENERATION REUSABLE SPACECRAFT

PROPULSION SYSTEMS AND INTERPLANETARY ACTIVITIES

SOLAR SAIL DEMONSTRATION

ELV DEPLOYMENT POSSIBILITY

CR /AF

CENTAUR / SDV DEEP SPACE CAPABILITY

LUNAR GEOSCIENCE ORBITER

LUNAR LANDING SITE RECON MISSION

LUNAR ROVER / SAMPLE RETURN MISSIONS?

CENTAUR HLV OR MLV DEEP SPACE MISSIONS

MARS ROVER / SAMPLE RETURN MISSIONS

SATURN-TITAN CASSINI MISSION (EXPANDED?)

COMET SAMPLE RETURN MISSION

VENUS SAMPLE RETURN MISSION

2 STAGE LEO-GEO-LEO OTV CAPABILITY

GEO MPE BIOSPHERE OBSERVATION PLATFORMS DEPLOYED-5 DEPLOYED 1996 - 2000

INDEPENDENT TRANSPORTATION NODE AND FUEL DEPOT?

MANNED OTV

MAN TENDED GEO

CISLUNAR AEROBRAKE CAPABILITY

MODULAR CREW / CARGO

2003

2008

2013

2018

2023

2028

SUBSTANTIAL PAYOFFS FROM SPACE INVESTMENTS BEGIN TO EMERGE

HUMAN EXPANSION INTO THE SOLAR SYSTEM BEGINS

HUMANITY

SECOND GENERATION REUSABLE SPACECRAFT

* INTERIM ORBITER (SHUTTLE II)
* NASP
* HERMES ORBITAL PLANE
* H-II HOPE ORBITAL PLANE
* SANGER-HORUS AEROSPACE PLANE

HEAVY LIFT LAUNCH CAPABILITY

* SHUTTLE "C"
* ALS
* ARIANE 5
* TITAN 4
* MLV
* H-2

ROUTINE ACCESS TO SPACE ACHIEVED

LARGE SCALE ECONOMIC AND INDUSTRIAL ACTIVITY IN SPACE

GOODS AND SERVICES FROM SPACE TO EARTH

UNLIMITED MATERIAL RESOURCES FROM THE MOON AND ASTEROIDS

ENVIRONMENTALLY SAFE SOLAR ENERGY FOR EARTH ?

* ELECTRICAL MATERIALS
* REMOTE SENSING AND RECONNAISSANCE
* SATELLITE SERVICING AND DEPLOYMENT
* RESOURCE BASE EXPLOITATION

RESOURCE BASE / MOMENTUM RESERVOIR

VENUS SAMPLE RETURN MISSION

CISLUNAR AEROBRAKE CAPABILITY

UNMANNED GEO COMM AND ERT PLATFORMS

RETURN-TO-MOON COMNET DEPLOYMENT

TETHERED SYSTEMS

ASTRONOMICAL AND PLANETARY OBSERVATIONS

LDF

LIFT CAPABILITY

NATIONAL AERO-SPACE PLANE / INTERIM ORBITER CAPABILITIES

SOLAR POWERED ELECTRIC PROPULSION

MARS AERONOMY ORBITER

MODULAR CREW / CARGO SPACE TRANSFER VEHICLE

MAINBELT ASTEROID MULTI-ORBITER/ FLYBY

NUCLEAR POWERED ELECTRIC PROPULSION

MARS NETWORK MISSION

GENERIC CREW / CARGO LUNAR LANDING & ASCENT VEHICLE

EARTH-MARS CARGO TRANSPORT

OUTER PLANETS FLYBY / PROBES

GEO CRYOGENIC AND HYPERGOLIC PROPELLANT DEPOT

EARTH / MARS INJECTION CAPABILITY

INDUSTRY / UNIVERSITY RESEARCH FACILITIES

HABITATION AND RESEARCH MODULES

LOX PILOT PRODUCTION UNIT

INTERNATIONAL SPACE UNIVERSITY

LEO RECREATIONAL EXCURSIONS

LUNAR ORBIT STAGING / FACILITY (LOSF)

RETURN-TO-MOON CORE SAMPLE COLLECTION AND ANALYSIS

LUNAR OUTPOST ESTABLISHED

LUNAR BASE EXPANDED LUNAR OUTPOST

LEO INTERNATIONAL SPACEPORT EXPANDED SPACE STATION

MOONPORT EXPANDED LOSF-LOCATION ?

SELF SUPPORTED LUNAR BASE

PHOBOS OUTPOST ESTABLISHED

MARS LANDING-HUMAN OUTPOST ESTABLISHED

PHOBOS - DEIMOS MINING OPERATIONS COMMENCE

INITIAL MARS BASE ESTABLISHED

ADVANCED TECHNOLOGY LEO SPACE STATION

MARTIAN SPACEPORT EXPANDED PHOBOS FACILITY

FULL-UP MARS BASE

DOD LOW INCLINATION SPACE STATION

EUROPEAN AUTONOMOUS SPACE STATION

CLOSED ECLSS

SURFACE EXPLORATION OF ANOTHER PLANETARY BODY

ROVER

MMW LUNAR FISSION REACTOR POWER PLANT

COMETARY / ASTEROIDAL MATERIALS PROSPECTING ON LUNAR SURFACE

EARTH MOVER

CRANE /HOIST

INCREASED LINAR SURFACE MOBILITY

* MID-RANGE &
* LONG-RANGE ENCLOSED ECLS ALL TERRAIN VEHICLES

IMBRIUM BASIN EXPEDITION-MULTIPLE SCIENTIFIC OUTPOSTS

CLOSED-LOOP LIFE SUPPORT

FARSIDE SETI OBSERVATORY

LANDING SITE RECON

DEIMOS - RECON AND PROSPECTING

MMW POWER GENERATOR

LOX PRODUCTION UNIT

HABITATION AND RESEARCH MODULES

ALL TERRAIN TRANSPORTATION

INCREASED SURFACE MOBILITY

REPAIR DEPOT

Fuel

SOLAR / ASTRONOMICAL OBSERVATION

CLOSED-LOOP LIFE SUPPORT

LOX PRODUCTION & STORAGE FACILITY

ORE EXTRACTION AND REGOLITH PROCESSING Al,Ca,Fe,Mg,Si,Ti,(He3,Ni)

INDIGENOUS RESOURCE HABITAT CONSTRUCTION

HEMISPHERICAL EARTH FACING COMM COVERAGE

MOONPORT / L1 PROPELLANT DEPOT

PILOT SSPS SOLAR CELL AND STRUCTURE MANUFACTURING

FIBER OPTIC CABLE MANUFACTURING

SECURE FIBER OPTIC --MULTI-BASE-- COMM NETWORK

LOX TO LLO ASCENT VESSEL

TETHERED SYSTEMS

DUST BRAKING

LUNAR TOURISM MARKET EMERGES

CLOSED ECLSS

LEO HEALTH CARE

SURFACE EXPLORATION

H,O,C,N EXTRACTION

PROPELLANT DEPOT

TETHERED MOONS

POLAR REGION EXPLORATION

MAINBELT ASTEROID EXPLORATION

ATTACH MDRE

MAINBELT ASTEROID ORBIT CHANGE

LOX PRODUCTION AND STORAGE FACILITY

CARBON

CLOSED-LOOP LIFE SUPPORT

INDIGENOUS

SOLAR ENERGY FARM/ AUTOMATED COLLECTOR MANUFACTURING

BEGIN SOLAR ELECTRIC GRID CONSTRUCTION

EARTH MOVING,MINING, AND TUNNELING OPERATIONS

MASS-DRIVER - ELECTRO-MAGNETIC LAUNCHER

SPACE POWER SATELLITE PILOT PLANT

SPACE COMMERCE ACTIVITIES

SPACE FACTORIES IN HEO

SPACE COMMERCE

VARIABLE "G" ANIMAL RESEARCH FACILITIES

LIBRATION POINT RESOURCE INVESTIGATION (L4 & L5)

MDRE CAPABILITY

NEAR-EARTH-ORBIT ASTEROID / COMET EXPLOITATION

MAINBELT ASTEROID ORBIT CHANGE / EXPLOITATION

SURFACE TO LEO AEROSPACE PLANE PTV FLEET OPERATIONS

IN-SPACE RESCUE CAPABILITY

L2 OR HIGH LUNAR POLAR ORBIT ?

MASS-CATCHER AND LOW-THRUST XPORT CAPABILITY

SDI / SPACE STATION RADIATION SHIELDING

INTERLIBRATIONAL STV / UTILITY VEHICLE CAPABILITY

THIN-FOIL SOLAR CONCENTRATOR PILOT PLANT (MELT AN ET)

EARTH-MOON CYCLING TRANSPORTATION

DOD EARTH-POLAR ORBITING MANNED SPACE STATION

POLAR ORBIT MANNED SPACE STATION CONSTELLATION

EUROPEAN HERMES ORBITAL PLANE CAPABILITY

THE GERMAN SANGER-HORUS AEROSPACE PLANE

JAPANESE H-II (HOPE) ORBITAL PLANE CAPABILITY

ENHANCED SSPS-EARTH ENVIRONMENTAL PATHFINDER

SOLAR CONCENTRATOR FACILITY

NEAR-EARTH SOLAR SAIL ASTEROID EXPLORER

MERCURY MINERALOGICAL MAPPER

MARTIAN CYCLING SPACE SHIP ELEMENT INTEGRATION

CREW AND CARGO TRANSFR ELEMENTS

CREW LANDING AND ASCENT ELEMENTS

CYCLER PROPULSION ELEMENT

LEO ASSEMBLY

TRANSFER TO L1

COMMERCIAL MANNED GEO COMMUNICATIONS PLATFORMS

INCREASED CAPACITY POTV

HEO INDUSTRIAL / SSPS PRODUCTION FACILITIES-2:1 RESONANT ORBIT ?

LOSF TRANSFER TO L1 ?

L1 EARTH-MOON LIBRATION POINT INTERPLANETARY ARRIVAL-DEPARTURE SPACEPORT

L1 ABSOLUTE CONTAINMENT FACILITY

MARTIAN CYCLING SPACE SHIP LAUNCH

INITIATE EARTH-MARS CYCLING SPACE SHIP TRANSPORTATION SYSTEM

2nd EARTH-MARS CYCLING SPACE SHIP / MARS LANDING GOAL

FIRST CYCLING SPACE SHIP RETURN TO MARS-INITIATE MARTIAN RESOURCE EXPLOITATION

ION-DRIVE ENGINE TECHNOLOGY

INITIAL INTERSTELLAR EXPLORATION

HEDM CHEMICAL PROPULSION

TAU 1000 A.U. UNMANNED PROBE

INITIATE EARTH-VENUS CYCLING SPACE SHIP TRANSPORTATION SYSTEM

ANTIMATTER-ENRICHED PROPELLENT

MANNED INTERPLANETARY SPACEFLIGHT BEGINS

FIRST MANNED MARS LANDING EXPEDITION

MARTIAN PROXIMITY IDV

MARS-MAINBELT MOBILITY VEHICLE

EARTH-MARS SOLAR SAIL XPORT SYSTEM

FIRST MANNED VENUS FLYBY

DEPLOY COMM NETWORK

ADVANCED LASER COMM NETWORK

VENUS ORBITING COMSATS DEPLOYED

VENUS EXPLORATION, ANALYSIS AND

HUMANITY BEGINS THE TRANSITION FROM A TERRESTRIAL TO A SOLAR SPECIES

GAIA PROLIFERATES

HUMAN EXPANSION INTO THE COSMOS BEGINS

SAFE SOLAR ENERGY FOR EARTH ?

2028

2033

2038

2043

2050

2100

HEDM CHEMICAL PROPULSION

1000 A.U. UNMANNED PROBE

MARS-MAINBELT MOBILITY VEHICLE

ADVANCED LASER COMM NETWORK

MAINBELT ASTEROID EXPLORATION

ATTACH MDRE

SURFACE MOBILITY

REPAIR DEPOT

EARTH ENVIRONMENTAL PATHFINDER

EARTH-MARS SOLAR SAIL XPORT SYSTEM

MAINBELT ASTEROID ORBIT CHANGE

FULL-UP MARS BASE

MAINBELT ASTEROID ORBIT CHANGE / EXPLOITATION

SOLAR CONCENTRATOR FACILITY

INITIATE EARTH-VENUS CYCLING SPACE SHIP TRANSPORTATION SYSTEM

FIRST MANNED VENUS FLYBY

VENUS ORBITING COMSATS DEPLOYED

LOX PRODUCTION AND STORAGE FACILITY

CLOSED-LOOP LIFE SUPPORT

ANTIMATTER-ENRICHED PROPELLENT PROPULSION

VENUS EXPLORATION, ANALYSIS AND TRANSFORMATION ACTIVITIES

CARBON MONOXIDE FUEL PRODUCTION AND STORAGE

INDIGENOUS MATERIAL HABITAT CONSTRUCTION

L4 / L5 INITIATE EARTH-MOON LIBRATION POINT HABITAT CONSTRUCTION

EARTH - VENUS SOLAR SAIL CARGO XPORT SYSTEM

SELF SUPPORTED MARTIAN BASE

ADVANCED TECHNOLOGY VENUS ORBITING SPACE STATION

GLOBAL TRANSPORTATION CAPABILITY

EXPANDING HE0 INDUSTRIAL CAPABILITY

VENUS PROXIMITY IDV

VENUS ORBITING SOLAR POWER STATION

MULTIPLE SCIENTIFIC OUTPOSTS

DIVERSION OF ASTEROIDIAL MATERIAL TO POLAR ORBIT

HUMAN OUTER SOLAR SYSTEM EXPLORATION BEGINS- JUPITER AND ITS JOVIAN SATELLITES

DIVERSION OF ASTEROIDIAL MATERIAL TO VENUS ORBIT

PROPELLANT DEPOT

RESOURCE EXTRACTION

POLAR ORBITING ENVIRONMENTAL OBSERVATION PLATFORMS

METALLIC ASTEROID RECONFIGURATION- PLANETOID FORMING

BALLOONBORNE ATMOSPHERIC RESEARCH

VENUS ORBITING ADVANCED COMM NETWORK

CREATE NEW MOONS FOR MARS IF REQUIRED

DARK SURFACE SOIL OR GIANT SOLAR REFLECTOR EMPLACEMENT

POLAR ORBITING SOLAR CONCENTRATOR FACILITY

INITIATE MARTIAN TERRAFORMING OPERATIONS

LARGE SCALE HUMAN OCCUPATION OF SPACE BEGINS

ORBITING ENVIRONMENTAL OBSERVATION PLATFORMS

MARTIAN ORBITING SKYHOOK COMPLEX

L4 / L5 INITIATE ISLAND ONE LIBRATION POINT HABITATION

SSPS PLANT PRODUCTION

INTERSTELLAR PRECURSOR

UNMANNED SCIENTIFIC SURFACE STATIONS

POLAR ORBITING RADIATION HARDENED HABITATS

HUMAN EXPLORATION OF SATURNIAN SATELLITES AND RING SYSTEM

UNMANNED SURFACE ROVERS

INITIAL SKYHOOK EXPERIMENTATION

GROWING L4 /L5 INDUSTRIAL CAPABILITY

L4 / L5 ISLAND TWO

SMALL MARTIAN SETTLEMENTS PROLIFERATE

CREATE TEMPORARY MOON / MOONS FOR VENUS

L4 / L5 MULTIPLE SETTLEMENT CONSTRUCTION

EXPANDING L4 / L5 INDUSTRIAL SOCIETY

GIANT PARASOL EMPLACEMENT

INITIATE VENUS TERRAFORMING OPERATIONS

EMERGENCE OF A SPACEFARING CIVILIZATION

PROPULSION SYSTEM INTEGRATION

NUCLEAR-PULSED PROPULSION

HUMAN OUTER SOLAR SYSTEM GRAND TOUR- URANUS / NEPTUNE / PLUTO

INDEPENDENT SPACE FARING HUMAN COMMUNITII S

LARGE SCALE HUMAN HABITATION OF MARS

HUMAN INTERSTELLAR TRAVEL

AD ASTRA

AD ASTRA

ABBREVIATIONS AND ACRONYMS

ALS	Advanced Launch Vehicle
AU	Astronomical Unit- I AU = 93,000,000 miles
AXAF	Advanced X-ray Astrophysics Facility
CDSF	Commercially Developed Space Facility
Cislunar	The space between the Earth and Moon
COMM	Communications
COMSAT	Communication Satellite
CR/AF	Comet Rendezvous / Asteroid Flyby
DOD	Department of Defense
ECLSS	Environmental Control And Life Support System
EDO	Extended Duration Orbiter
ELV	Expendable Launch Vehicle
EMU	Extravehicular Mobility Units
ERT	Earth Resources Technology
ET	External Tank
ET/ACC	External Tank / Aft Cargo Carrier
FTS	Flight Telerobotic Servicer
G	Gravity
GEO	Geosynchronous-Earth-Orbit
GPS	Global Positioning Satellite
HEDM	High Energy-Density Matter
HEO	High-Earth-Orbit
HLV	Heavy Lift Vehicle
IDV	Interlibrational Derived Vehicle
IUS	Inertial Upper Stage
IUV	Interlibrational Utility Vehicle
L1	Langrange Point # 1 35,000 Miles Above Moon
L2	Langrange Point # 2 40,000 Miles Behind Moon
L4	Langrange Point # 4 240,000 Mile Earth Orbit
L5	Langrange Point # 5 240,000 Mile Earth Orbit
LBS	Pounds
LDF	Large deployable Reflector
LEO	Low-Earth-Orbit
LLO	Low-Lunar-Orbit
LOSF	Lunar Orbit Staging Facility
LOX	Liquid Oxygen
LRB	Liquid Rocket Booster
MDRE	Mass Driver Reaction Engine
MKW	Multi-kilo Watt
MLV	Medium Lift Vehicle
MMU	Manned Maneuvering Unit
MMW	Multi-mega Watt Power Source
MOMV	Manned Orbital Maneuvering Vehicle
MOTV	Manned Orbital Transfer Vehicle
MPE	Mission To Planet Earth
NASA	National Aeronautics and Space Administration
NASP	National Aerospace Plane
NSTS	National Space Transportation System
OBS	Observatory
OMV	Orbital Maneuvering Vehicle
OTV	Orbital Transfer Vehicle
OV	Orbiter Vehicle
PAM	Payload Assist Module
POTV	Personnel Orbit Transfer Vehicle
PTV	Passenger Transport Vehicle
RECON	Reconnaissance
RMS	Remote Manipulator System
SAT	Satellite
SDI	Space Defense Initiative
SDV	Shuttle Derived Vehicle
SETI	Search For Extraterrestrial Intellegence
SIRTF	Space Infrared Telescope Facility
SLC	Space Launch Complex
SPS	Solar Power Satellite
SRB	Solid Rocket Booster
SSPS	Satellite Solar Power Station
STV	Space Transfer Vehicle
TAU	Thousand Astronomical Unit
TDRS	Tracking Data Relay Satellite
TOS	Transfer Orbit Stage
US	United States
XFER	Transfer
XPORT	Transport

TEN BEST CANDIDATE STARS FOR INTERSTELLAR EXPLORATION

STAR	DISTANCE LIGHT-YEARS	VISUAL MAGNITUDE	LUMINOSITY (SUN=1.0)	SPECTRAL TYPE
Tau Ceti	11.8	3.5	.4	G8
82 Eridani	20.2	4.3	.7	G5
Zeta Tucanae	23.3	4.2	.9	G2
107 Piscium	24.3	5.2	.4	K1
Alpha Mensae	28.3	5.1	.6	G5
54 Piscium	34.0	5.9	.4	K0
Zeta 1 Reticuli	37.0	5.5	.7	G2
Zeta 2 Reticuli	37.0	5.2	.9	G2
Gliese 86	37.0	6.1	.4	K0
Gliese 67	38.0	5.0	1.2	G2

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